

# Notice No.1

## for the Code for Lifting Appliances in a Marine Environment, July 2021

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note for the corrigenda items paragraphs, Tables and Figures are not shown in their entirety.

### Issue date: November 2021

Amendments to	Effective date	IACS/IMO implementation (if applicable)
Chapter 1, Section 1	1 January 2022	N/A
Chapter 4, Section 1	1 January 2022	N/A
Chapter 4, Section 2	1 January 2022	N/A
Chapter 5, Section 3	1 January 2022	N/A
Chapter 8, Section 9	1 January 2022	N/A
Chapter 12, Sections 1 & 3	1 January 2022	N/A
Chapter 13, Sections 1, 2 & 3	1 January 2022	N/A

# Chapter 1

## General

### ■ Section 1 Introduction

#### 1.2 Certification

1.2.5 The minimum requirements for the issue by LR of certification in accordance with the Code are:

- (a) Plan approval of the structural arrangements.
- (b) Verification of materials.
- (c) Verification of manufacturer's certificates for loose gear, ropes, etc.
- (d) Survey of the appliance.
- (e) Testing of the appliance when installed on board.

Note: For the requirements outlined in (b) and (c), check tests may be required at the discretion of the Surveyor.

## Chapter 4

### Cranes and Submersible Lifting Appliances

### ■ Section 1 Introduction

#### 1.2 Lifting appliances and crane types

(Part only shown)

1.2.1 This Chapter will be the basis of approval by Lloyd's Register (hereinafter referred to as LR) of the following types of crane or lifting appliance:

- (k) Heavy lift cranes (or lifting appliances) mounted on vessels, pontoons and offshore installations. Heavy lift cranes (or lifting appliances) are defined by the following:
  - Safe Working Load (SWL)  $\geq 160$  t; and/or
  - ~~Maximum of 1000 lifts per year having more than 80 per cent of the maximum SWL;~~
  - Influences the vessels final heel angle by more than  $5^\circ$  and/or the vessels final trim angle by more than  $2^\circ$  (if not compensated by ballasting).

### ■ Section 2 Shipboard cranes

#### 2.15 Load combinations

2.15.2 **Case 1.** For the condition of the crane operating without wind, the design is to be considered with respect to a combination of dead load, live load and horizontal forces defined in [Ch 4, 2.6 Dynamic forces due to crane movements](#) to [Ch 4, 2.11 Forces due to ship motion](#), as given by the following expression:

$$F_d [L_g + F_h (L_{hl} + L_{h1}) + L_{h2} + L_{h3}]$$

where

$F_d$  = duty factor

$L_g$  = dead load

$F_h$  = hoisting factor

$L_{hl}$  = live load

~~$F_h$  = hoisting factor~~

$L_{h1}$  = the horizontal component of live load due to heel and trim

$L_{h2}$  = the next most unfavourable horizontal load (usually due to slewing acceleration)

$L_{h3}$  = the horizontal component of dead load due to heel and trim.

2.15.3 **Case 2.** For the condition of the crane operating with wind, the design is to be considered with respect to a combination of dead load, live load and horizontal forces defined in [Ch 4, 2.6 Dynamic forces due to crane movements](#) to [Ch 4, 2.11 Forces due to ship motion](#), together with the most unfavourable wind load. This is given by the following expression:

$$F_d [L_g + F_h (L_l + L_{h1}) + L_{h2} + L_{h3}] + L_w$$

where

$L_w$  = the most unfavourable wind load.

2.15.4 **Case 3.** The crane is to be considered in its stowed condition when subjected to forces resulting from accelerations due to the ship's motions and static inclination, together with wind forces appropriate to the stowed condition (see [Ch 4, 2.11 Forces due to ship motion](#)). The effects of anchorages, locks and lashings, etc. are to be taken into consideration.

2.15.5 **Case 4.** The crane may also need to be considered with respect to the following exceptional load conditions:

- (a) Coming into contact with buffers.
- ~~(b) Failure of the hoist wire or sudden release of load for cranes with counterweight ( $F_h$ , to be taken as  $-0,2$ ).~~
- (b) Failure of the hoisting rope during testing or normal operation ( $F_h$ , to be taken as  $-0,3$ ).
- (c) Sudden release of load during testing or normal operation ( $F_h$ , to be taken as  $-0,3$ ).
- ~~(c)(d)~~ Test loading.

For heavy lift cranes (or lifting appliances) a risk assessment is to be carried out to evaluate the consequences due to failure of the hoisting rope or sudden release of load and the identified risks are to be mitigated to acceptable levels. The system integrator in cooperation with the manufacturer of the crane and the designer of vessel shall prepare a Safety Statement in line with LR's ShipRight Procedure *Risk Based Certification (RBC)* process and/or in line with the requirements of the National Administration (as applicable). The risk mitigation may include the following measures:

- (a) the application of a testing concept that would identify components along the main load path which could be tested separately before assembly of the lifting appliance on board, where the extent of the separate testing is also to be based on the results of the risk assessment;
- (b) positioning of the load to be lifted or test load (e.g. at the stern of the ship) in such a way that any single point failure (e.g. drop of load) will not lead to further failures (e.g. collapse of parts of the crane); and
- (c) consideration of the design of the ship and lifting appliance as a single system in such a way that any single point failure will not lead to further failures (e.g. capsizing of the ship, damage of the crane, possible interference with any onboard structure).

## 2.16 Stability

(Part only shown)

2.16.1 Travelling cranes, trolleys, grabs, etc. which are capable of travelling whilst loaded are to be examined with regard to stability against overturning for the following conditions:

- (b) Consideration of sudden release of load in accordance with load combination Case 2, with the hoisting factor,  $F_h$ , taken as  $-0,2$   $-0,3$ .

## 2.25 Materials

2.25.2 The selected steel grade is to provide adequate assurance against brittle fracture, taking into account the material tensile strength and thickness and the environment in which the crane is designed to operate, see [Ch 11 Materials and Fabrication](#), and is in general to comply with the Charpy V-notch impact test requirements given in [Table 4.2.17 Charpy V-notch impact test temperature requirements for welded primary and secondary steel structure. Excludes stainless steel, Table 4.2.18 Charpy V-notch test impact energy requirements for classed and certified lifting appliances](#) [Table 4.2.18 Charpy V-notch impact test energy requirements for classed and certified lifting appliances](#) and [Table 4.2.19 Charpy V-notch impact test temperature requirements for non-welded components \(excluding slew bearings\) subject to tensile loading. Excludes stainless steels.](#)

(Table not shown)

**~~Table 4.2.18 Charpy V-notch test impact energy requirements for classed and certified lifting appliances~~ Table 4.2.18 Charpy V-notch impact test energy requirements for classed and certified lifting appliances**

# Chapter 5

## Shiplift and Transfer Systems

### Section 3

#### Materials of construction

Existing sub-Sections 3.1 and 3.2 have been deleted and replaced with below:

#### 3.1 Materials for certified installations

3.1.1 Materials intended for the construction of lifting appliances are to be in accordance with recognised National or International Standards that include materials which are equivalent to those specified in the *Rules for the Manufacture, Testing and Certification of Materials*, but where the approval and survey requirements do not comply with the requirements of *Ch 1 General Requirements* of the *Rules for the Manufacture, Testing and Certification of Materials* and Section 1 of subsequent Chapters of the *Rules for the Manufacture, Testing and Certification of Materials*, as appropriate, materials may be subject to additional testing under LR Survey prior to acceptance for any project.

3.1.2 The requirements with respect to toughness criteria are the same as for classed installations, see *Ch 5, 3.2 Materials for classed installations 3.2.3* and *Table 5.5.2 Failure stress*.

3.1.3 Structural steel in the primary load path, including pins and wheels, is to be supplied with a manufacturer's certificate, as defined in *Ch 1, 3 Certification of materials* of the *Rules for the Manufacture, Testing and Certification of Materials*. This certificate is equivalent to inspection certificate 3.1 as per the requirements of EN 10204 *Metallic products – Types of inspection documents* or ISO 10474 *Steel and steel products – Inspection documents*, issued by the manufacturer of the materials.

#### 3.2 Materials for classed installations

3.2.1 The materials used in the construction of classed shiplifts and transfer systems are to be manufactured and tested in accordance with the requirements of the *Rules for the Manufacture, Testing and Certification of Materials*. Materials for which provision is not made therein may be accepted, provided that the requirements as defined in *Ch 1, 1 Introduction 1.6.1 (b)* are complied with.

3.2.2 Structural steel in the primary load path, including pins and wheels, are to be supplied with an LR certificate or a manufacturer's certificate validated by LR, as defined in *Ch 1, 3 Certification of materials* of the *Rules for the Manufacture, Testing and Certification of Materials*.

3.2.3 Steel for the primary strength members is to comply with:

- *Table 4.2.17 Charpy V-notch impact test temperature requirements for welded primary and secondary steel structure. Excludes stainless steel;*
- *Table 4.2.18 Charpy V-notch impact test energy requirements for classed and certified lifting appliances; and*
- *Table 4.2.19 Charpy V-notch impact test temperature requirements for non-welded components (excluding slew bearings) subject to tensile loading. Excludes stainless steels.*

The Charpy V-notch impact test requirements for minimum design temperatures above -10°C and below -40°C will be specially considered.

3.2.4 Alternative proposals in respect of the notch toughness characteristics of the materials will be considered when the climate at the service location of the particular installation is such that there is a low probability of low temperatures.

# Chapter 8

## Fittings, Loose Gear and Ropes

### Section 1

#### General

#### 1.2 Materials and construction

1.2.7 Large cast items, e.g. large capacity cast hooks, are to be thoroughly examined by NDE to check that there are no internal defects in the casting nor any surface defects. to confirm that the components are free from surface or internal defects which would lead to failure. The applied NDE specification and acceptance criteria should be proposed by the designer and approved by Lloyd's Register.

## Section 5 Loose gear

### 5.2 Hooks

5.2.3 Hooks are to be forged from killed steel with suitable mechanical properties and heat treatment conditions. ~~Forged hooks can be normalised mild steel or suitably heat treated higher strength steel.~~ Cast hooks are not generally permitted but special consideration will be given on a case-by-case basis to proposals for cast hooks that are manufactured in accordance with recognised National or International Standards. ~~Stress and fatigue calculations supporting the proposal shall be provided.~~ The following information is to be included in the proposal:

- (a) proposed material specification including the applicable National or International Standard, material grade, chemical composition, and mechanical properties and heat treatment conditions;
- (b) stress and fatigue calculations supporting the proposal; and
- (c) proposed surface and volumetric NDE specification, procedure and acceptance criteria including the technical justification of the criteria, i.e. casting simulations showing the potential casting defect area and/or calculated tolerable defect size based on engineering assessment.

Other manufacturing methods, such as additive manufacturing, will require special consideration.

5.2.7 The hook shank is to be such that the direct tensile stress complies with [Table 8.3.3 Allowable stresses in blocks](#). ~~Detailed design at the end of the threaded section is to be such as to minimise stress concentrations.~~ Alternatively, the allowable stresses for the hook shank may be calculated using the approach as defined in [Ch 8, 3.5 Hook blocks](#). Detailed design is to be such as to minimise stress concentrations and in particular at the end of the threaded section. Shanks are to be forged from killed steel with suitable mechanical properties and heat treatment conditions. Cast shanks are not generally permitted but special consideration will be given on a case-by-case basis to proposals for cast shanks (reference is made to [Ch 8, 5.2 Hooks 5.2.3 \(a\)](#) to [Ch 8, 5.2 Hooks 5.2.3 \(c\)](#)). Other manufacturing methods, such as additive manufacturing, will require special consideration.

## Chapter 12 Testing, Marking and Surveys

### Section 1 Testing

#### 1.1 General

1.1.5 Suitable precautions are to be taken before commencing the test to ensure the stability of the ship and the throughout the load test and also in case of a failure of the load test. The adequacy of the supporting structure to bear the test loads is also to be ensured.

1.1.6 A risk assessment is to be carried out to evaluate the consequences of any failures during the load test and the identified risks are to be mitigated to acceptable levels. The system integrator in cooperation with the manufacturer of the crane and the designer of vessel shall prepare a Safety Statement in line with LR's ShipRight Procedure *Risk Based Certification (RBC)* process and/or in line with the requirements of the National Administration (as applicable).

The risk mitigation may include the following measures;

- (a) the application of a testing concept that would identify components along the main load path which could be tested separately before assembly of the lifting appliance on board, where the extent of the separate testing is also to be based on the results of the risk assessment;
- (b) positioning of the test load (e.g. at the stern of the ship) in such a way that any single point failure (e.g. drop of load) will not lead to further failures (e.g. collapse of parts of the crane); and
- (c) consideration of the design of the ship and lifting appliance as a single system in such a way that any single point failure will not lead to further failures (e.g. capsizing of the ship, damage of the crane, possible interference with any onboard structure).

*Existing paragraphs 1.1.6 and 1.1.7 have been renumbered 1.1.7 and 1.1.8.*

#### 1.2 Loose gear

1.2.2 Every item of loose gear is to be proof load tested and thoroughly examined before being taken into use for the first time and prior to fitting to a lifting appliance or after any subsequent repair or alteration which may affect the strength of the item. The proof load applied to each item of loose gear is to be as required by [Table 12.1.1 Proof loads for loose gear](#) and associated Notes, and illustrated in [Figure 12.1.1 Proof loads for loose gear](#).

## Section 3

### Survey requirements

#### 3.4 Periodical Thorough Examinations

**Table 12.3.5 Annual Thorough Examination of derrick systems**

Item	Survey
General note	The thorough examination shall take into account the designer's/manufacturer's maintenance and inspection instructions and recommendations.
1. Certification	<p>(a) Check that certification, in the form of a Lifting Appliance Register of Ship's Lifting Appliances and Cargo Handling Gear or Cargo Gear Register Book issued by a competent body, exists for the rigs to be examined.</p> <p>(b) Check the Register for any outstanding endorsements, recurring problems, down-ratings, etc.</p> <p>If there is no evidence that the rigs have ever been certified, the thorough examination is to be declined and LR's certification services for existing rigs may be offered.</p> <p>(c) Check the Register for any repairs or modifications.</p> <p>(d) Check the maintenance records.</p>
2. Arrangements	Check that arrangement of loose gear, rigging, guys, mast stays, etc. is as shown in Cargo Gear Particulars Book or Rigging Plan.
3. Derrick boom and mast fittings	<p>(a) Inspect lugs, fittings, brackets, etc. at derrick head and mast head.</p> <p>(b) Withdraw and inspect goosenecks, trunnion fittings, etc. together with their pins.</p> <p>(c) Withdraw other pins and inspect mast head span swivels, tumblers, etc.</p> <p>(d) Check pins for deformation, wear, scoring or other defects.</p> <p>(e) Inspect any independent anchorages for heel blocks.</p> <p>(f) Check efficiency of lubrication to swivels, goosenecks, trunnions, etc.</p>
4. Fittings on deck	<p>(a) Inspect deck eyeplates, cleats, wire rope stoppers, etc. used in normal working, as indicated by the Master or Officer in charge, for wear or deformation.</p> <p>(b) Check weld attaching eyeplates to deck.</p>
5. Derrick boom	<p>(a) Inspect the structure for condition of coating. Inspect for corrosion. (Where this is suspected, paint is to be removed as necessary.) Special attention is to be paid to the part of the boom which comes into contact with the crutch or housing.</p> <p>(b) Hammer test boom and, if then considered necessary, check thickness by ultrasonic testing or other suitable methods that do not affect the material or condition of the boom.</p> <p>(c) Look for any scars or dents and check that boom is not bent.</p> <p>(d) Where appropriate, check condition and free movement of the head and heel fittings. Where considered necessary, the boom may be manoeuvred through all its working positions.</p>
6. Blocks	<p>(a) Verify that blocks are of the appropriate Safe Working Load for the position in which they are rigged and properly certificated.</p> <p>(b) All blocks to be inspected. This Block inspection may be carried out on board the ship, provided the necessary facilities are available. Where repair of the block is necessary, it is to be carried out in a properly equipped workshop.</p> <p>(c) Sheaves and pins are to be removed, but sheaves forming an integral part of the derrick boom may be examined <i>in situ</i>.</p> <p>(d) Load bearing parts of the block, including head fittings, are to be cleaned (the paint being removed where necessary) and inspected for signs of excessive or uneven wear, cracks, lack of lubrication or scoring of the rope groove.</p> <p>(e) The nut or collar of the shank or swivel head fittings is to be inspected to check that it is securely fastened and free from visible defects. The shank should turn freely by hand and wear is not to be excessive. The shank is to be removed if required.</p> <p>(f) Cheek and partition plates are to be examined for any signs of buckling, distortion, cracks, ovality in pin holes and sharp edges.</p> <p>(g) If any repair affects the strength of the block, or if a certificate of test is not available, or if the unique identification mark is illegible, the block is to be re-tested and certified.</p>
7. Shackles, links, rings, hooks, triangle plates, etc.	<p>(a) Check all that loose gear items can be identified against appropriate certificates: (LA.3 or equivalent).</p> <p>(b) Examine under proper conditions and check for cracks, deformation, wear, wastage or other defects. Items are to be free from paint, grease, scale, etc.</p> <p>(c) Confirm that the material is recorded on the test certificate. The certificate should distinguish between mild steel, higher tensile steel and alloy steel.</p> <p>(d) If deformation of the shackle is found, and re-setting is carried out, the shackle is to be suitably heat treated, re-tested and certified. Deformed shackles or shackle pins shall be replaced.</p>

	(e) If the shackle pin is renewed, the whole shackle is to be re-tested and certified.
8. Wire ropes	<p>(a) <del>Check all wire ropes can be identified against appropriate certificates. Confirm that appropriate wire ropes certificates are on board (LA.4 or equivalent).</del></p> <p>(b) Check the general condition of each rope ropes by examining as much of its their length as is possible.</p> <p>(c) Check for broken or worn wires. Check for any signs of internal and external corrosion. Check for changes in rope diameter. Check for signs of any deformation (e.g. kinks, birdcaging, etc.), or of thermal damage. In general, the rope is to be replaced immediately if any of the discard criteria in ISO 4309:2010 are exceeded.</p> <p>(d) Inspect all rope terminations, splices, end fittings, etc. with particular attention to broken wires at ferrule connections. Any serving on splices is to be removed for the examination.</p> <p>(e) Liverpool splices are to be rejected on any rope where the ends are not secured against rotation.</p> <p>(f) Before re-rigging ensure that the wire rope has been lubricated.</p>
9. Natural and man-made fibre ropes	<p>(a) <del>Check all fibre ropes can be identified against appropriate certificates. Confirm that appropriate fibre ropes certificates are on board (LA.5 or equivalent).</del></p> <p>(b) Survey condition of rope.</p> <p>(c) Check for external chafe and cutting and for internal wear between the strands.</p> <p>(d) Check for local or general deterioration of natural fibre ropes due to mildew or rot.</p> <p>(e) Check ropes for chemical attack or other contamination.</p>
10. Chains	<p>(a) <del>Check all chains can be identified against an appropriate certificate. Confirm that appropriate chain certificates are on board (LA.3 or equivalent).</del></p> <p>(b) The chain is to be taken to a suitably equipped workshop for examination and examined after removal of paint, grease, scale, etc. and wire brushing.</p> <p>(c) Check for deformation, wear or other defects. If links require renewal, the chain is to be suitably heat-treated and re-tested. Replacement links are to be of equivalent material and strength to the original.</p> <p>(d) Confirm that the material is recorded on the test certificate. The certificate should distinguish between mild steel, higher tensile steel and alloy steel.</p>
11. Re-testing	<p>(a) Loose gear is to be proof tested if repairs have been carried out which affect its strength or if certificates are not available.</p> <p>(b) Re-testing of the derrick is necessary at 5-yearly intervals, and after repairs have been carried out affecting its strength or otherwise as required by the Surveyors.</p> <p>(c) If a component part of the derrick, such as a derrick heel pin, has been replaced, re-testing is not called for if the component has been tested individually to the resultant load which would have been imposed upon it if it had been tested <i>in situ</i>.</p> <p>(d) Where the repaired or renewed item has not been tested, the derrick is to be re-tested.</p> <p>(e) The test is also to demonstrate the effectiveness of limit switches, etc.</p>
12. Masts, derrick posts, guy posts, etc. and structure in way	The Periodical Survey requirements for classification are to be complied with, see <a href="#">Pt 1, Ch 3 Periodical Survey Regulations</a> of the <del>Rules for Ships</del> <a href="#">Rules and Regulations for the Classification of Ships</a> .



**Table 12.3.6 Annual Thorough Examination of cranes and launch and recovery systems for diving operations**

Item	Survey
General notes	<p>These requirements should, in general, also be applied to derrick cranes.</p> <p>The thorough examination shall take into account the designer's/manufacturer's maintenance and inspection instructions and recommendations.</p>
1. Certification	<p>(a) Check that certification, in the form of a <del>Lifting Appliance Register of Ship's Lifting Appliances and Cargo Handling Gear</del> or Cargo Gear Register Book issued by a competent body, or equivalent for offshore cranes, exists for the lifting appliances to be examined.</p> <p>(b) Check the Register for any outstanding endorsements, recurring problems, down-ratings, etc.</p> <p>If there is no evidence that the appliances have ever been certified, the thorough examination is to be declined and LR's certification services for existing appliances may be offered.</p> <p>(c) Check the Register for any repairs or modifications.</p> <p>(d) Check the maintenance records.</p>
2. Arrangements	<p>Check reeving arrangement and hoist block assembly are as shown in Cargo Gear Particulars Book, Rigging Plan, or Manufacturer's Manual. Check that the arrangement of hydraulic cylinders (if applicable) is as shown on the reeving diagram or appropriate plans.</p>
3. Fixed sheaves, blocks, axle pins and housings	<p>(a) Determine that the sheaves are free from cracks. The extent of the examination is to be such that a reliable judgement can be made. Depending on access, it may be necessary to dismantle the item.</p> <p>(b) Survey rope groove for scoring or uneven wear.</p> <p>(c) Check that lubrication arrangements are in working order.</p> <p>(d) Check security (keep plates, cotter pins, etc.) of fixed axle pins.</p> <p>(e) Check for free rotation of sheave on axle pin.</p> <p>(f) Check for excessive wear of axle pin and sheave bush. <del>Check condition of housing and separation plates and for signs of ovality in the pin holes</del></p> <p>(g) Check condition of housing and separation plates and for signs of ovality in the pin holes.</p>
4. Jib heel pins	<p>(a) Check lubrication for detrimental wear.</p> <p>(b) Check security (keep plates, cotter pins, castle nuts, etc.) of heel pins.</p>
5. Slewing rings for cranes on ships	<p>(a) Listen to the bearing during slewing motion for any untoward noises. Also note the age of the bearing or its operational hours (if possible) and check against guidance in manufacturer's maintenance manual. Older bearings will be more prone to problems.</p> <p>(b) Check any maintenance records for evidence of regular routine maintenance.</p> <p>(c) Check condition and tightness (<del>with a torque wrench using a method recommended by the manufacturer</del>) of all inner and outer bearing bolts, removing any protective caps if fitted. Sample bolts may be removed at the discretion of the Surveyor to check for the possibility of stress corrosion cracking.</p> <p>(d) Review the results of the latest rocking test measurements or grease sample analysis carried out in accordance with the manufacturer's recommendations and check the recommended limits for either wear or metallic particle content are not being exceeded. This will give an indication of the wear in the bearing. These tests are usually carried out annually.</p> <p>(e) Check the effectiveness of lubrication of the bearing. <del>Is it reaching all parts of the bearing and pinions? Is it clean or contaminated?</del></p> <p>(f) Additional inspections are to be carried out where these are specified by the crane or slew ring manufacturer.</p> <p>(g) Any requirements of the National Authority (i.e. Flag State) are required to be complied with.</p>
6. Slewing rings for cranes on offshore installations	<p><del>Slew bearings</del> Slew bearings used on offshore cranes in some jurisdictions (including the North Sea) should either be subject to periodic removal, strip-down and examination or be subjected to a system of <i>in situ</i> condition monitoring. Both possibilities are to be agreed with a competent person (CP).</p> <p>The period between removal and examination is to be agreed with the competent person and will depend on the type of bearing fitted. The minimum is usually every three years for basic bearings where no securing device (retainers which would prevent the crane from toppling off its pedestal in the event of a complete bearing failure) is fitted and which have no condition monitoring system fitted.</p> <p>Upon removal of the bearing, the extent of the examination is to be agreed with the competent person.</p> <p>However, LR would expect the following to be included, as a minimum:</p> <p>(a) Examination of the raceway surfaces.</p>



- (b) Most bearings have hardened raceway surfaces and NDE through the whole depth of the softer core of the raceway is required to detect any internal flaws that could jeopardise the integrity of the bearing, including detachment of the hardened surface.
- (c) Examination of all safety critical areas, e.g. the corner radii of the ribs on the internal raceway or on the flanges of the external raceway.
- (d) ~~Examine~~ Examination of the condition of the rolling elements, their cages and seals.
- (e) ~~Examine~~ Examination of the condition of the fasteners. These will generally be ISO 898/1 grade 8.8 or 10.9 fasteners.

**NOTE**

Grade 12.9 fasteners are not usually permitted offshore.

- (f) ~~Condition~~ Examination of the condition of any retaining device fitted.

Any refurbishment or repair must be done with the agreement of the bearing manufacturer and the competent person. The bearing is not to be replaced on the crane until a re-assembly/reassembly certificate has been issued by the competent person.

If, in the opinion of the competent person, the original strength and capacity of the bearing has been compromised, the bearing is not to be put back into service.

**Condition Monitoring Systems.** Where condition monitoring systems are used in lieu of periodic removal and examination of ~~slew bearings~~ ~~slew bearings~~, they are to consist of the following four key elements:

- Grease sampling. Samples of grease are to be taken from several dedicated points on the ring (usually from 4 ~~four~~ places at 90° apart) each year (or as determined by the CP). The samples are to be analysed by a suitably qualified laboratory for metallic and water content and the results passed to the CP.
- Rocking tests are to be carried out by a qualified person in accordance with the crane manufacturer's recommendation to monitor the wear in the races and to check that they are within the limits prescribed by the crane manufacturer.
- Load history of the crane. The load history (history of all lifts and radii) is to be recorded by an approved data logger generally linked through the crane's Safe Load Indicator (SLI). This will show if the crane is working at mostly full or reduced capacity in its service.
- Fastener Checks. The condition of the bolts or studs, together with a check on their torques, and replacement history is to be recorded. The frequency of these is to be agreed with the CP.

The competent person is to review the results of all of the above and decide whether the slew bearing is fit to continue in service, or whether a more detailed examination is required or if replacement is necessary.

Other jurisdictions may have other requirements and these are to be followed as appropriate, but the requirements for ship crane slew bearings in (5) above are to be followed as a minimum.

Any requirements of the National Authority (i.e. Flag State) and/or Coastal State Authorities are required to be complied with.

**7. Wire ropes**

- (a) ~~Check all wire ropes can be identified against appropriate certificates. Confirm that appropriate wire ropes certificates are on board (LA.4 or equivalent).~~
- (b) Check the general condition of ~~each rope~~ ~~ropes~~ by examining as much of its ~~their~~ length as is possible.
- (c) Check for broken or worn wires. Check for any signs of internal and external corrosion. Check for changes in rope diameter. Check for signs of any deformation (e.g. kinks, birdcaging, etc.), or of thermal damage. In general, the rope is to be replaced immediately, if any of the discard criteria in ISO 4309:2010 are exceeded.
- (d) Inspect all rope terminations, splices, end fittings, etc. with particular attention to broken wires at ferrule connections. Any serving on splices is to be removed for the examination.
- (e) Liverpool splices are to be rejected on any rope where the ends are not secured against rotation.
- (f) Before re-rigging ensure that the wire rope has been lubricated.

**8. Structure and general**

- (a) Check all structural bolts for tightness. Where bolts have been replaced, they are to be of the same type, size and quality as previously fitted.
- (b) ~~Check pedestal and Survey~~ foundation bolts for signs of corrosion and flange distortion.
- (c) Check main welds for cracks. Initially by visual examination but NDE can be used at the Surveyor's discretion.
- (d) Check welds between the pedestal/foundation and the ship. Initially by visual examination but NDE can be used at the Surveyor's discretion.
- (de) ~~Inspect the structure for condition of coating.~~ Inspect the structure for corrosion, removing paint and carrying out hammer tests as necessary. If considered necessary, the

	<p>thickness of structural items is to be checked by ultrasonic testing drilling or other approved method suitable methods that do not affect the material or condition of the structure.</p> <p>(ef) Check jib, tower, support pedestal, gantry, etc. for any signs of local indentations, buckling, cracks or unfairness. Particular attention is to be given to connections of jib chords and transverses, hydraulic cylinder connections, sheave housing attachments, jib heel brackets and other areas where there is significant load input.</p> <p>(fg) In the case of travelling cranes, check rails, stops and stowage arrangements.</p> <p>(gh) Check jibs in way of their stowage crutched for signs of wear and indentations.</p>
9. Shackles, links, rings, hooks, etc.	<p>(a) Check all loose gear items, including hook blocks, can be identified against appropriate hooks, etc. certificates- (LA.3 or equivalent).</p> <p>(b) Examine under proper conditions and check for cracks, deformation, wear, wastage or other defects. Items are to be free from paint, grease, scale, etc.</p> <p>(c) Confirm that the material is recorded on the test certificate. The certificate should distinguish between mild steel, higher tensile steel and alloy steel.</p> <p>(d) If deformation of the shackle is found and re-setting is carried out, the shackle is to be suitably heat treated, re-tested and certified. Deformed shackles or shackle pins shall be replaced.</p> <p>(e) If the shackle pin is renewed, the whole shackle is to be re-tested and certified.</p>
10. Chains	<p>(a) Check all chains can be identified against an appropriate certificate. Confirm that appropriate chain certificates are on board (LA.3 or equivalent).</p> <p>(b) The chain is to be taken to a suitably equipped workshop for examination and examined after removal of paint, grease, scale, etc. and wire brushing.</p> <p>(c) Check for deformation, wear or other defects. If links require renewal, the chain is to be suitably heat-treated and re-tested. Replacement links are to be of equivalent material and strength to the original.</p> <p>(d) Confirm that material is recorded on test certificate. The certificate should distinguish between mild steel, higher tensile steel and alloy steel.</p>
11. Rope drums	<p>(a) At least three turns of wire rope are to remain on the drum in all operating positions, including in the case of luffing ropes, when the jib is 'crutched'.</p> <p>(b) Check that the anchorages of all wire ropes are effective. Check the effectiveness of wire rope anchorages.</p> <p>(c) Check drum for cracks and for defects liable to damage the rope.</p> <p>(d) Check the effective working of any fleeting device fitted.</p> <p>(e) Check drum flanges for bending or distortion. This is particularly appropriate for multi-layer spooling drums.</p>
12. Hydraulic arrangements	<p>(a) Check hydraulic hoses, pipes, couplings, actuators, filters, valves, measuring devices, control blocks and other hydraulic components for leakage and/or damage.</p> <p>(b) Check hydraulic pumps and motors for leakage and/or damage.</p> <p>(c) Check hydraulic accumulators for leakage, deformation and/or other damage.</p> <p>(d) Check pre-fill pressure of the hydrogen bottles, as applicable.</p> <p>(e) Check for correct oil levels.</p>
13. Hydraulic cylinders, winches, etc. and attachments	<p>(a) Check condition of machinery systems.</p> <p>(ab) Check for leaks and condition of hydraulic pipes and couplings.</p> <p>(bc) Check piston rod for scoring and signs of deformation.</p> <p>(ed) Check end pivot pins and bearings for any excessive wear and deformation, and the security of the pins.</p> <p>(de) Check that mounting brackets are free from deformation, cracks or damage.</p> <p>(f) Check safety systems, such as limit switches and slack rope detection systems.</p> <p>(g) Check fasteners, pins, gear boxes, shafts, bearings, lubrication, etc.</p> <p>(h) Check condition of brake (e.g. pads, brake linings).</p>
14. Electrical and control arrangements	<p>(a) Check the operator station and other operating arrangements for suitable condition.</p> <p>(b) Check operation of audible and visual warnings (as applicable).</p> <p>(c) Check electrical arrangements in general and cabling for state and secure connection.</p> <p>(d) Check effectiveness of limit switches.</p> <p>(e) Check condition of electric motors (as applicable).</p> <p>(f) Check for safe operational behaviour as required by the instructions for use.</p> <p>(g) Conduct earthing test, e.g. megger test.</p>
15. Re-testing	<p>(a) Loose gear is to be proof tested if repairs have been carried out which affect its strength or if certificates are not available.</p> <p>(b) Re-testing of the crane is necessary at 5-yearly intervals and after repairs or modifications have been carried out affecting the strength or otherwise as required by the Surveyors. The test is to demonstrate satisfactory operation, efficiency of overload and weightload indicators, effectiveness of limit switches, etc.</p> <p>(c) It is essential that the crane is operated at each survey to check hoist, slewing, luffing and travel motions, and the operation of limit switches for over-hoisting, over-lowering, luffing, slewing and travel.</p>

- (d) Lifting appliances used for raising, lowering or transferring manned submersibles are to be re-tested annually and also following any structural repairs, alteration or re-erection of the appliance.
- (e) Lifting appliances used for raising, lowering or transferring manned bells or submarines are to be re-tested annually and also following any structural repairs, alteration or re-erection of the appliance.

**Table 12.3.7 Annual Thorough Examination of cargo lifts and ramps**

Item	Survey
General note	The thorough examination shall take into account the designer's/manufacturer's maintenance and inspection instructions and recommendations.
1. Certification	<p>(a) Check that certification, in the form of a <del>Lifting Appliance Register of Ship's Lifting Appliances and Cargo Handling Gear</del> or Cargo Gear Register Book issued by a competent body, exists for the lifts and ramps to be examined.</p> <p>(b) Check the Register for any outstanding endorsements, recurring problems, down-ratings, etc.</p> <p>If there is no evidence that the lifts or ramps have ever been certified, the thorough examination is to be declined and LR's certification services for existing appliances may be offered.</p> <p>(c) Check the Register for any repairs or modifications.</p> <p>(d) Check the maintenance records.</p>
2. Arrangements	Check that the reeving of wire ropes, chains or the arrangement of hydraulic cylinders is as shown on the reeving diagram or appropriate plans. Check marking on ramps of lifts with respect to the ship's loading booklet and the <del>Register of Ship's Cargo Gear and Lifting Appliances</del> Register of Ship's Lifting Appliances and Cargo Handling Gear.
3. Sheaves, sprockets, guide rollers, axle pins and bearings, etc.	<p>(a) Determine that sheaves, sprockets and guide rollers, etc. are free from cracks or scores and that they are free to rotate.</p> <p>(b) Survey rope grooves for scoring or uneven wear, and sprockets for signs of abnormal wear, hooking, etc.</p> <p>(c) Check that lubrication arrangements are in working order.</p> <p>(d) Check axle pins and bearings with regard to deformation and excessive wear, and the security of the pins.</p>
4. Wire ropes	<p>(a) <del>Check all wire ropes can be identified against appropriate certificates. Confirm that appropriate wire ropes certificates are on board (LA.4 or equivalent).</del></p> <p>(b) Check the general condition of <del>each rope</del> ropes by examining as much of <del>its</del> their length as is possible.</p> <p>(c) Check for broken or worn wires. Check for any signs of internal and external corrosion. Check for changes in rope diameter. Check for signs of any deformation (e.g. kinks, birdcaging, etc.), or of thermal damage. In general, the rope is to be replaced immediately, if any of the discard criteria in ISO 4309:2010 are exceeded.</p> <p>(d) Inspect <del>all</del> rope terminations, splices, end fittings, etc. with particular attention to broken wires at ferrule connections. Any serving on splices is to be removed for the examination.</p> <p>(e) Before re-rigging ensure that the wire rope has been lubricated.</p>
5. Chains	<p>(a) <del>Check all chains can be identified against an appropriate certificate. Confirm that appropriate chain certificates are on board (LA.3 or equivalent).</del></p> <p>(b) Inspect the chain, which is to be sufficiently free from grease and scale, etc. to enable a satisfactory examination to be made.</p> <p>(c) Check for deformation, wear or other defects. If links require renewal, the chain is to be suitably heat-treated and re-tested. Replaced links are to be of equivalent material and strength to the original.</p> <p>(d) Confirm that material is recorded on the test certificate. The certificate should distinguish between mild steel, higher tensile steel and alloy steel.</p>
6. Hydraulic cylinders, winches, etc. and attachments	<p>(a) Check condition of machinery systems.</p> <p>(ab) Check for leaks and check condition of hydraulic pipes.</p> <p>(bc) Check piston rods, pivot pins and bearings, etc. for excessive wear and deformation.</p> <p>(ed) Determine that sheaves are free from cracks, scores, or uneven wear and they are free to rotate.</p> <p>(de) Check that mounting brackets are free from deformation, cracks or damage.</p> <p>(f) Check safety systems, such as limit switches and slack rope detection systems.</p> <p>(g) Check fasteners, pins, gear boxes, shafts, bearings, lubrication, etc.</p> <p>(h) Check condition of brake (e.g. pads, brake linings).</p>
7. Main pivots, articulations, slewing bearings (if fitted), etc.	<p>(a) Check that <del>all</del> main pivots and bearings are free from excessive play.</p> <p>(b) Check that bearing surfaces are free from scoring, pitting, etc.</p> <p>(c) Check that pivot pins do not have excessive wear or deformation, and the security of the pins is sound.</p> <p>(d) Check that lubrication arrangements are in working order.</p>

8. Structure and general	<p>(a) Check all structural bolts for tightness. Where bolts have been replaced, they are to be of the same type, size and quality as previously fitted.</p> <p>(b) Check main welds for cracks. Initially by visual examination but NDE can be used at the Surveyor's discretion.</p> <p>(c) Inspect the structure for condition of coating. Inspect load bearing structure for corrosion, removing paint and carrying out hammer tests as necessary. If considered necessary, the thickness of structural items is to be checked by ultrasonic testing drilling or other suitable methods that do not affect the material or condition of the structure.</p> <p>(d) Check load bearing plating and main structural members for cracks and any signs of local indentation, buckling or unfairness.</p> <p>(e) Check structure in way of any stowage locks for wastage, cracks, deformation, etc.</p>
9. Shackles, links, etc.	<p>(a) Check all loose gear items can be identified against appropriate certificates: (LA.3 or equivalent).</p> <p>(b) Check for cracks, deformation, wear, wastage or other defects. Items are to be free from paint, grease, scale, etc.</p> <p>(c) Confirm that the material is recorded on the test certificate. The certificate is to distinguish between mild steel, higher tensile steel and alloy steel.</p> <p>(d) If deformation of the shackle is found and re-setting is carried out, the shackle is to be suitably heat treated, re-tested and certified. Deformed shackles or shackle pins shall be replaced.</p> <p>(e) If the shackle pin is renewed, the whole shackle is to be re-tested and certified.</p>
10. Rope drums	<p>(a) At least three turns of wire rope are to remain on the drum in all operating positions.</p> <p>(b) Check that the anchorages of all wire ropes are effective. Check the effectiveness of wire rope anchorages.</p> <p>(c) Check drum for cracks and for defects liable to damage the rope.</p> <p>(d) Check the effective working of any fleeting device fitted.</p> <p>(e) Check drum flanges for bending or distortion. This is particularly appropriate for multi-layer spooling drums.</p>
11. Hydraulic arrangements	<p>(a) Check hydraulic hoses, pipes, couplings, actuators, filters, valves, measuring devices, control blocks and other hydraulic components for leakage and/or damage.</p> <p>(b) Check hydraulic pumps and motors for leakage and/or damage.</p> <p>(c) Check hydraulic accumulators for leakage, deformation and/or other damage.</p> <p>(d) Check pre-fill pressure of the hydrogen bottles, as applicable.</p> <p>(e) Check for correct oil levels.</p>
12. Operating locks, stowage locks, safety guards, etc.	<p>(a) Check that operating locks, safety guards and stowage locks operate effectively.</p> <p>(b) Check locking pins on latches, etc. and their respective location bearing parts for abnormal wear or deformation.</p> <p>(c) Ensure that hydraulic actuating cylinders, etc. are free from leaks, wear and abnormal deformation.</p> <p>(d) Ensure that mounting brackets, etc. are effective and securely attached to the ship or lift structure.</p>
13. Guides	<p>(a) Check that the guides do not have excessive wear or deformation and that joints are secure.</p> <p>(b) Check that brackets attaching guides to ship structure are effective and in good order.</p>
14. Seals	Where weathertight seals are fitted, their general condition is to be satisfactory and their effectiveness is to be checked using a water spray test or other suitable method.
15. Electrical and control arrangements	<p>(a) Check the operator station and other operating arrangements for suitable condition.</p> <p>(b) Check operation of audible and visual warnings (as applicable).</p> <p>(c) Check electrical arrangements in general and cabling for state and secure connection.</p> <p>(d) Check effectiveness limit of switches.</p> <p>(e) Check condition of electric motors (as applicable).</p> <p>(f) Check for safe operational behaviour as required by the instructions for use.</p> <p>(g) Conduct earthing test, e.g. megger test.</p>
16. Re-test	<p>(a) Re-testing of the lift or ramp is necessary at 5-yearly intervals, or as required by the National Authority, and when modifications and repairs have been carried out affecting the strength or as required by the Surveyor.</p> <p>(b) It is essential that the lift or ramp is operated at each thorough examination throughout the full operational range for each mode of operation and to check that the limit switches, interlocks, guards and safety devices operate satisfactorily.</p>

**Table 12.3.8 Annual Thorough Examination of passenger lifts**

Item	Survey
General note	The thorough examination shall take into account the designer's/manufacture's maintenance and inspection instructions and recommendations.

1. Certification	<p>(a) Check that certification, in the form of a <del>Lifting Appliance Register of Ship's Lifting Appliances and Cargo Handling Gear</del> or Cargo Gear Register Book or national forms issued by a competent body, exists for the passenger lifts to be examined.</p> <p>(b) Check the Register for any outstanding endorsements, recurring problems, down-ratings, etc.</p> <p>If there is no evidence that the lifts have ever been certified, the thorough examination is to be declined and LR's certification services for existing appliances may be offered.</p> <p>(c) Check the Register for any repairs or modifications.</p> <p>(d) Check the maintenance records.</p>
2. Arrangements	<p>(a) Check that the reeving of wire ropes and chains and the arrangement of hydraulic cylinders are as shown on the appropriate plans.</p> <p>(b) Check that the plate indicating the allowable load mounted inside the lift is in agreement with the appropriate plan(s) and as indicated in the <del>Register of Ship's Cargo Gear and Lifting Appliances</del> Register of Ship's Lifting Appliances and Cargo Handling Gear.</p>
3. Sheaves, sprockets, guide rollers, axle pins and bearings, etc.	<p>(a) Determine that sheaves, sprockets and guide rollers, etc. are free from cracks or scores and that they are free to rotate.</p> <p>(b) Survey rope grooves for scoring or uneven wear. Survey sprockets for signs of abnormal wear, hooking, etc.</p> <p>(c) Check that lubrication arrangements are in working order.</p> <p>(d) Check axle pins and bearings with regard to deformation and excessive wear, and the security of the pins.</p>
4. Wire ropes	<p>(a) <del>Check all wire ropes can be identified against appropriate certificates. Confirm that appropriate wire ropes certificates are on board (LA.4 or equivalent).</del></p> <p>(b) Check the general condition of each rope <del>ropes</del> by examining as much of <del>its</del> <del>their</del> length as is possible.</p> <p>(c) Check for broken or worn wires. Check for any signs of internal and external corrosion. Check for changes in rope diameter. Check for signs of any deformation (e.g. kinks, birdcaging, etc.), or of thermal damage. In general, the rope is to be replaced immediately if any of the discard criteria in ISO 4309:2010 are exceeded.</p> <p>(d) Inspect <del>all</del> rope terminations, splices, end fittings, etc. with particular attention to broken wires at ferrule connections. Any serving on splices is to be removed for the examination.</p> <p>(e) Before re-rigging ensure that the wire rope has been lubricated.</p>
5. Chains	<p>(a) <del>Check all chains can be identified against an appropriate certificate. Confirm that appropriate chain certificates are on board (LA.3 or equivalent).</del></p> <p>(b) Inspect the chain, which is to be sufficiently free from grease and scale, etc. to enable a satisfactory examination to be made.</p> <p>(c) Check for deformation, wear or other defects. If links require renewal, the chain is to be suitably heat-treated and re-tested. Replaced links are to be of equivalent material and strength to the original.</p> <p>(d) Confirm that <del>the</del> material is recorded on the test certificate. The certificate should distinguish between mild steel, higher tensile steel and alloy steel.</p>
6. Hydraulic arrangements	<p>(a) Check hydraulic hoses, pipes, couplings, actuators, filters, valves, measuring devices, control blocks and other hydraulic components for leakage and/or damage.</p> <p>(b) Check hydraulic pumps and motors for leakage and/or damage.</p> <p>(c) Check hydraulic accumulators for leakage, deformation and/or other damage.</p> <p>(d) Check pre-fill pressure of the hydrogen bottles, as applicable.</p> <p>(e) Check for correct oil levels.</p>
76. Hydraulic cylinders, winches, etc. and attachments	<p>(a) Check condition of machinery systems.</p> <p>(ab) Check for leaks and check condition of hydraulic pipes.</p> <p>(bc) Check piston rods, pivot pins and bearings, etc. for excessive wear and deformation.</p> <p>(ed) Determine that sheaves are free from cracks, scores and uneven wear and that they are free to rotate.</p> <p>(de) Check that mounting brackets are free from deformation, cracks and damage.</p> <p>(f) Check fasteners, pins, gear boxes, shafts, bearings, lubrication, etc.</p>
87. Landing and car doors	<p>(a) Check that the landing and car doors operate satisfactorily.</p> <p>(b) Check that interlocks on the doors operate effectively.</p> <p>(c) Inspect the door and check that its fire-resisting capacity is unimpaired.</p>
98. Car and counterweight	<p>(a) Examine the car and counterweight for damage which could affect their operating efficiency or carrying capacity.</p> <p>(b) Check that brackets for sheaves, guide rollers, wire terminations, etc. are secure and in good order.</p>

	(c) Inspect the car, including the car frame, and check that the fire-resisting capacity of the car is unimpaired.
109. Lift trunk and well	(a) Check that the lift trunk and well are free from debris or damage which could impair the satisfactory operation of the lift. (b) Check that trunk has not been damaged, is suitably ventilated and is totally enclosed such as to prevent passage of smoke and flame from one deck to another.
110. Guides and buffers	(a) Check that the car and counterweight guides are not worn or distorted and that the joint plates are secure. (b) Check that the brackets attaching guides to the trunk are in good order. (c) Check that buffers are in good order and supports are sound.
124. Over-running devices and brakes	Check that over-running devices and brakes (e.g. pads, brake linings) are operating satisfactorily and are in good order.
134. Safety gear	Check that the safety gear for preventing the car from falling is secure and in good order. A test of the safety gear is to be carried out to demonstrate its effectiveness.
143. Safety equipment	(a) Check that escape hatches, ladders, etc. are free from obstruction and in good order. (b) Check that the emergency telephone and warning system operate satisfactorily. (c) Check that all warning notices, etc. are legible and secure.
15. Electrical and control arrangements	(a) Check operation of audible and visual warnings (as applicable). (b) Check electrical arrangements in general and cabling for state and secure connection. (c) Check effectiveness of limit switches (as applicable). (d) Check condition of electric motors (as applicable). (e) Check for safe operational behaviour as required by the instructions for use. (f) Conduct earthing test, e.g. megger test.
164. Re-test	(a) Re-testing is necessary at 5-yearly intervals, or as required by the National Authority, and when modifications and repairs have been carried out affecting the strength, or as required by the Surveyor. (b) It is essential that the lift is operated at each annual thorough examination to check that the limit switches, interlocks, and safety devices operate satisfactorily.

# Chapter 13

## Documentation

### Section 1 General

#### 1.2 Certificates for certification

1.2.2 The certificates issued by LR are based upon the ILO Convention C152 model forms ~~I.L.O. series~~ and are listed in [Table 13.1.1 Certificates for certification](#) together with relevant comments.

**Table 13.1.1 Certificates for certification**

Certificate	LR Form Number	Title	Comments
LA.1	1365	Register of Ship's Lifting Appliances and Cargo Handling Gear	This is the document in which all the lifting appliances which have been certified are listed and subsequently, periodical, damage and other surveys are recorded. Certificates of examination and test of the lifting appliances and certificates for ropes and individual items of loose gear are to be attached to this document.
LA.2	1380	Certificate of Test and Thorough Examination of Lifting Appliances	This certificate is to be used for all lifting appliances. This certificate is to be <del>re-issued</del> reissued following subsequent re-tests.
LA.2U	1381	Certificate of Test and Thorough Examination of Derricks used in Union Purchase	<del>Must</del> This certificate must be accompanied by LA.2.
LA.3	1382	Certificate of Test and Thorough Examination of Loose Gear before being taken into use, and of such gear after it has been altered or repaired	Contents may be transferred from manufacturer's test certificate, the number of which is to be stated on the LA.3. Reference to 'altered or repaired' loose gear means alterations or repairs which affect the strength of the item. A pulley block may be considered to include any special shackles or other fittings designed to fit and work exclusively with the block. These fittings may be tested with the block and should have the same certificate identification mark. This certificate is also to be used for spreaders, lifting beams and similar items of equipment. This certificate may be <del>re-issued</del> reissued following subsequent periodical re-testing independent of the lifting appliance (i.e. workshop re-testing), if such re-testing is specifically required by a National Authority.
LA.4	1383	Certificate of Test and Thorough Examination of Wire Rope, before being taken into use	Each length of wire rope is to be supplied with a certificate. The certificate may be made up from the master certificate supplied by the rope manufacturer with each coil of rope and/or a factual statement (Form 1123) issued by the local Surveyor. In the absence of a master certificate issued by the rope manufacturer and/or factual statement issued by LR, or if this cannot be related to the particular lengths of rope, then each length is to be tested and an LA.4 issued on the basis of these tests.
LA.5	1384	Certificate of Test and Thorough Examination of Fibre Rope, before being taken into use	There is no equivalent to an ILO Convention C152 model form <del>I.L.O. form</del> but an LA.5 is to be issued in all cases where fibre or man-made ropes are used. The comments applicable to LA.4 also apply.
—	—	Certificate of Classification of Lifting Appliances and Associated Gear	To be issued for all lifting appliances on board LR classed ships to which a class notation has been assigned.



## Section 2 Certification procedure

### 2.6 Certification procedure

2.6.1 An overview over the certification process and the required and issued documentation is provided in [Table 13.2.1 Minimum requirements for the certification of lifting appliances](#).

(Part only shown)

**Table 13.2.1 Minimum requirements for the certification of lifting appliances**

Certification process step	Component	Required or issued documentation	References
General note	Complete lifting appliance	N/A	<a href="#">Ch 1, 1.2 Certification 1.2.5</a>
2 Verification of materials Remark: Where materials are not manufactured at an LR approved works, check testing may be required at the discretion of the Surveyor	Structural materials	'Manufacturer's certificate' as defined in <a href="#">Ch 1, 3 Certification of materials</a> of the <a href="#">Rules for the Manufacture, Testing and Certification of Materials</a>  (equivalent to inspection certificate EN 10204, 3.1)  (equivalent to inspection certificate 3.1 as per the requirements of EN 10204 or ISO 10474)	LR <a href="#">Rules for the Manufacture, Testing and Certification of Materials</a> (or approved equivalent)  Relevant Chapters of this Code
	Winches (main load-bearing and safety-critical components)		
	Hydraulic cylinders (main load-bearing and safety-critical components) (see <a href="#">Ch 9, 5 Hydraulic cylinders</a> in particular)		
	Wire ropes		
	Loose gear		
	Other similar main components not listed in the above		

## Section 3 Classification procedure

### 3.1 General

3.1.5 An overview of the classification process and the required and issued documentation is provided in [Table 13.3.1 Minimum requirements for the classification of lifting appliances](#).

(Part only shown)

**Table 13.3.1 Minimum requirements for the classification of lifting appliances**

Classification process step	Component	Required or issued documentation	References
General note	Complete lifting appliance	N/A	<a href="#">Ch 1, 1.3 Classification 1.3.5</a>
2 Verification of materials Remark: Materials are required to be delivered from a Lloyd's Register approved works	Structural materials	'LR certificate' or 'Manufacturer's certificate validated by LR' as defined in <a href="#">Ch 1, 3 Certification of materials</a> of the <a href="#">Rules for the Manufacture, Testing and Certification of Materials</a>  (equivalent to inspection certificate EN 10204, 3.2)	<a href="#">Rules for the Manufacture, Testing and Certification of Materials</a>  <a href="#">Rules and Regulations for the Classification of Ships</a>  Relevant Chapters of this Code
	Winches (main load-bearing and safety critical components)		
	Hydraulic cylinders (main load-bearing and safety-critical components) (see <a href="#">Ch 9, 5 Hydraulic cylinders</a> in particular)		
	Wire ropes		
	Loose gear		
	Piping systems	See <a href="#">Pt 5, Ch 12 Piping Design Requirements</a> of the <a href="#">Rules and Regulations for the Classification of Ships</a> ,	
	Gearing	'Manufacturer's certificate' as defined in <a href="#">Ch 1, 3 Certification of materials</a> of the <a href="#">Rules for the Manufacture,</a>	

		<p><i>Testing and Certification of Materials</i></p> <p>(equivalent to inspection certificate EN 10204, 3.1)</p> <p>(equivalent to inspection certificate 3.1 as per the requirements of EN 10204 or ISO 10474)</p>	
	Other similar main components not listed in the above	<p>'LR certificate' or 'Manufacturer's certificate validated by LR', as defined in <i>Ch 1, 3 Certification of materials</i> of the <i>Rules for the Manufacture, Testing and Certification of Materials</i></p> <p>(equivalent to inspection certificate EN 10204, 3.2)</p>	

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